CLAIMS

1. The use of at least one polypeptide comprising at least one fragment of a protein to obtain a diagnostic, prognostic, prophylactic or therapeutic composition for detecting, preventing or treating a pathological condition associated with multiple sclerosis, said protein being chosen from proteins whose peptide sequence in the native state corresponds to SEQ ID No. 1, SEQ ID No. 2, SEQ ID No. 3, SEQ ID No. 4, SEQ ID No. 5, SEQ ID No. 6, SEQ ID No. 7, SEQ ID No. 8, SEQ ID No. 10, SEQ ID No. 11, SEQ ID No. 12, SEQ ID No. 13, SEQ ID No. 14, SEQ ID No. 15, SEQ ID No. 16, SEQ ID No. 17, SEQ ID No. 18, SEQ ID No. 19, SEQ ID No. 20, SEQ ID No. 21, SEQ ID No. 22, SEQ ID No. 23, SEQ ID No. 24, SEQ ID No. 25, SEQ ID No. 26, SEQ ID No. 27, SEQ ID No. 28 and SEQ ID No. 29 and the peptide sequences which exhibit at least 70% identity, preferably at least 80% identity and advantageously at least 98% identity with any one of the peptide sequences SEQ ID No. 1 to SEQ ID No. 8 and SEQ ID No. 10 to SEQ ID No. 29, and the peptide sequences or the fragments of said sequences belonging to the same family of proteins chosen from Perlecan, the precursor of the retinol-binding plasma protein, precursor of the ganglioside GM2 activator, calgranulin B and saposin B.

2. The use as claimed in claim 1, of at least two polypeptides in combination as defined in claim 1.

3. Use according to claim 1, characterized in that said protein is chosen from the proteins whose peptide sequence in the native state corresponds to SEQ ID No. 2, SEQ ID No. 4, SEQ ID No. 8, SEQ ID No. 17 and SEQ ID No. 24 and the peptide sequences which exhibit at least 70% identity,

preferably at least 80% identity and advantageously at least 98% identity with any one of the peptide sequences SEQ ID No. 2, SEQ ID No. 4, SEQ ID No. 8, SEQ ID No. 17 and SEQ ID No. 24.

4. The use as claimed in claim 3, of five polypeptides in combination, as defined in claim 3.

5. The use as claimed in any one of claims 1 to 4, characterized in that the peptide sequence of said polypeptide comprises a sequence chosen from any one of SEQ ID No. 2, SEQ ID No. 4, SEQ ID No. 8, SEQ ID No. 17 and SEQ ID No. 24.

6. The use as claimed in any one of claims 1 to 4, characterized in that the peptide sequence of said polypeptide consists of a sequence chosen from any one of SEQ ID No. 2, SEQ ID No. 4, SEQ ID No. 8, SEQ ID No. 17 and SEQ ID No. 24.

7. The use of a polypeptide fragment defined in claim 1 or in claim 3 for the preparation of an immunogenic peptide, characterized in that said peptide comprises all or part of at least one of the sequences designated by the references SEQ ID No. 58 to 65.

8. The use of at least one nucleotide fragment to obtain a diagnostic, prognostic, prophylactic or therapeutic composition for detecting, prognosticating, preventing or treating a pathological condition associated with multiple sclerosis, according to which said nucleotide fragment is chosen from fragments which encode at least one fragment of a protein as defined in claim 1.

9. The use as claimed in claim 8, characterized in that said nucleotide fragment encodes said protein.

10. The use of at least one nucleotide fragment to obtain a diagnostic, prognostic, prophylactic or therapeutic composition for detecting, prognosticating, preventing or treating a pathological condition associated with multiple sclerosis, according to which said fragment is a fragment of a nucleic sequence chosen from any one of SEQ ID No. 30, SEQ ID No. 31, SEQ ID No. 32, SEQ ID No. 33, SEQ ID No. 34, SEQ ID No. 35, SEQ ID No. 36, SEQ ID No. 37, SEQ ID No. 38, SEQ ID No. 39, SEQ ID No. 40, SEQ ID No. 41, SEQ ID No. 42, SEQ ID No. 43, SEQ ID No. 44, SEQ ID No. 45, SEQ ID No. 46 and SEQ ID No. 47, SEQ ID No. 48, SEQ ID No. 49 and SEQ ID No. 50, SEQ ID No. 51, SEQ ID No. 52, SEQ ID No. 53, SEQ ID No. 54, SEQ ID No. 55, SEQ ID No. 56, SEQ ID No. 57, SEQ ID No. 67, SEQ ID No. 66, SEQ ID No. 69, SEQ ID No. 70 and SEQ ID No. 71, and their complementary sequences.

11. The use of a ligand specific for a polypeptide or for a nucleotide fragment as claimed in any one of the preceding claims to obtain a diagnostic, prognostic, prophylactic or therapeutic composition for detecting, prognosticating, preventing or treating a pathological condition associated with multiple sclerosis.

12. A method for detecting at least one protein associated with multiple sclerosis, in a biological sample, characterized in that the biological sample is brought into contact with at least one ligand specific for at least one polypeptide as defined in claim 1, and then the

formation of a complex between said polypeptide and said ligand is detected.

13. The method as claimed in claim 12, characterized in that said ligand is a monoclonal antibody, a polyclonal antibody, a receptor, a substrate for enzymatic activity or an enzyme for which said polypeptide is a cofactor.

14. A method for detecting at least one ligand associated with multiple sclerosis, in a biological sample, characterized in that the biological sample is brought into contact with at least one polypeptide as defined in claim 1, and then the formation of a complex between said polypeptide and said ligand is detected.

15. The method as claimed in claim 14, characterized in that the ligand is an antibody, a receptor, a substrate for enzymatic activity or an enzyme for which said polypeptide is a cofactor.

16. The method as claimed in any one of claims 12 to 15, characterized in that the sequence of said polypeptide comprises a peptide sequence chosen from any one of SEQ ID No. 1 to 8 and SEQ ID No. 10 to 29.

17. The method as claimed in any one of claims 12 to 15, characterized in that the sequence of said polypeptide consists of a peptide sequence chosen from any one of SEQ ID No. 1 to 8 and SEQ ID No. 10 to 29.

18. The method as claimed in any one of claims 12 to 15, characterized in that the biological sample is urine, cerebrospinal fluid or serum.

19. A polypeptide, characterized in that it comprises at least one fragment of a protein whose peptide sequence corresponds to SEQ ID No. 9, said fragment comprising at least one mutation in relation to the reference sequence SEQ ID No. 8.

20. The polypeptide as claimed in claim 19, characterized in that it comprises at least two mutations in relation to the reference sequence SEQ ID No. 8.

21. The polypeptide as claimed in claim 20, characterized in that it is chosen from the polypeptides which comprise the sequence SEQ ID No. 68 and the sequence SEQ ID No. 72.

22. The polypeptide as claimed in one of claims 19 to 21, characterized in that it comprises a protein whose peptide sequence corresponds to SEQ ID No. 9.

23. The polypeptide as claimed in one of claims 19 to 21, characterized in that it consists of a protein whose peptide sequence corresponds to SEQ ID No. 9.

24. The use of at least one polypeptide as claimed in any one of claims 19 to 23 to obtain a diagnostic, prognostic, prophylactic or therapeutic composition for detecting, prognosticating, preventing or treating a pathological condition associated with multiple sclerosis.

25. The use as claimed in claim 24, characterized in that said polypeptide is used in the form of a mixture with at least one polypeptide as defined in any one of claims 1 to 6.

26. A method for detecting at least one ligand associated with multiple sclerosis, in a biological sample, characterized in that the biological sample is brought into contact with at least one polypeptide as defined in any one of claims 19 to 23, and then the formation of a complex between said polypeptide and the ligand is detected.

27. The method as claimed in claim 26, characterized in that the biological sample is in addition brought into contact with at least one polypeptide as defined in any one of claims 1 to 5.

28. The method as claimed in claim 26 or 27, characterized in that said ligand is an antibody, a receptor, a substrate for enzymatic activity or an enzyme for which said polypeptide is a cofactor.

29. A method for detecting at least one polypeptide as defined in any one of claims 19 to 23, in a biological sample, characterized in that the biological sample is brought into contact with at least one ligand specific for said polypeptide, and then the formation of a complex between said polypeptide and said ligand is detected.

30. The method as claimed in claim 29, characterized in that said ligand is a monoclonal antibody, a polyclonal antibody, a receptor, a substrate for enzymatic activity or an enzyme for which said polypeptide is a cofactor.

31. The method as claimed in claim 27 or 28, characterized in that the biological sample is brought into contact with a ligand as defined in either of claims 28 and 30 and at least one ligand specific for at least one polypeptide as defined

in any one of claims 1 to 5, and then the formation of complexes between said polypeptides and said ligands specific for said polypeptides is detected.

32. The method as claimed in claim 31, characterized in that the ligand is a monoclonal antibody, a polyclonal antibody, a receptor, a substrate for enzymatic activity or an enzyme for which said polypeptide is a cofactor.

33. A nucleotide fragment, characterized in that it encodes a polypeptide as defined in any one of claims 19 to 23.

34. The use of a nucleotide fragment to obtain a diagnostic, prognostic, prophylactic or therapeutic composition for detecting, prognosticating, preventing or treating a pathological condition associated with multiple sclerosis, according to which said nucleotide fragment is the nucleotide fragment defined in claim 33, optionally in combination with at least one nucleotide fragment as defined in any one of claims 8 to 10, and the fragments complementary to said fragments.

35. The method as claimed in any one of claims 26 to 32, characterized in that the biological sample is urine, cerebrospinal fluid or serum.

36. The method as claimed in any one of claims 26 to 32, characterized in that the degenerative and/or autoimmune disease is multiple sclerosis.

37. A method for detecting, in a sample of biological fluid, at least one polypeptide as defined in any one of claims 1 to 5 or in any one of claims 19 to 23, according to which, optionally after

purification of said sample, the mass profile obtained from said sample is analyzed by mass spectrometry and compared with a reference mass profile.

38. The use of at least one polypeptide as defined in claim 1 to obtain a diagnostic, prognostic, prophylactic or therapeutic composition for detecting, preventing, or treating a pathological condition associated with multiple sclerosis, and preferably of at least one polypeptide as defined in claim 5.

39. The use as claimed in claim 38, in which the peptide sequences comprise the peptide sequences or the fragments of said sequences belonging to the same family of proteins chosen from the precursor of the ganglioside GM2 activator and saposin B.

40. The use as claimed in either of claims 38 or 39, which is associated with the use of a detection of a gliotoxic activity.

41. A method for detecting, in a sample, a value for the concentration of at least one polypeptide as claimed in any one of claims 38 to 40, said concentration being associated with a pathological condition, characterized in that said polypeptide is assayed, the assay making it possible to obtain a concentration value which is compared with a threshold value representative of multiple sclerosis.

42. The method as claimed in claim 41, in which the threshold value is obtained by an ELISA test for a urine sample, this value being:

- 400 ng/ml for the precursor of the ganglioside GM2 activator, for the GM2AP84 antibody, and

- 2 µg/ml for saposin B, for the SAPB84 antibody.

43. The method as claimed in claim 12, characterized in that the biological sample consists of cells or supernatants of said cells from a patient likely to suffer from multiple sclerosis.

44. The method as claimed in claim 43, in which the biological sample consists of monocyte or macrophage cells or of supernatants of these cells.

45. The method as claimed in either of claims 43 and 44, in which the biological sample consists of cells in culture or of supernatants of these cells in culture, after a period of between 6 and 12 days of culture, preferably after 9 days.

46. The method as claimed in either of claims 43 and 44, in which the biological sample consists of cells, ex vivo, preferably monocytes or macrophages.

47. The use of at least one polypeptide as defined in claim 1 for testing the efficacy of a therapeutic agent.

48. The use of at least one polypeptide comprising at least one fragment of a protein for the preparation of a pharmaceutical composition for treating multiple sclerosis, said protein being chosen from proteins whose peptide sequence in the native state corresponds to SEQ ID No. 1, SEQ ID No. 2, SEQ ID No. 3, SEQ ID No. 4, SEQ ID No. 5, SEQ ID No. 6, SEQ ID No. 7, SEQ ID No. 8, SEQ ID No. 9, SEQ ID No. 10, SEQ ID No. 11, SEQ ID

No. 12, SEQ ID No. 13, SEQ ID No. 14, SEQ ID No. 15, SEQ ID No. 16, SEQ ID No. 17, SEQ ID No. 18, SEQ ID No. 19, SEQ ID No. 20, SEQ ID No. 21, SEQ ID No. 22, SEQ ID No. 23, SEQ ID No. 24, SEQ ID No. 25, SEQ ID No. 26, SEQ ID No. 27, SEQ ID No. 28 and SEQ ID No. 29 and the peptide sequences which exhibit at least 70% identity, preferably at least 80% identity and advantageously at least 98% identity with any one of the peptide sequences SEQ ID No. 1 to 29, and the peptide sequences or the fragments of said sequences belonging to the same family of proteins chosen from Perlecan, the precursor of the retinol-binding plasma protein, precursor of the ganglioside GM2 activator, calgranulin and saposin.

49. The use as claimed in claim 47 or 48, characterized in that the polypeptide is chosen from SEQ ID No. 2, 4, 8, 9, 17, 24.

50. The use of at least one nucleotide fragment, to test the efficacy of a therapeutic agent for a pathological condition associated with multiple sclerosis, according to which said nucleotide fragment is chosen from the fragments which encode at least one fragment of a protein, said protein being chosen from proteins whose peptide sequence in the native state corresponds to SEQ ID No. 1, SEQ ID No. 2, SEQ ID No. 3, SEQ ID No. 4, SEQ ID No. 5, SEQ ID No. 6, SEQ ID No. 7, SEQ ID No. 8, SEQ ID No. 9, SEQ ID No. 10, SEQ ID No. 11, SEQ ID No. 12, SEQ ID No. 13, SEQ ID No. 14, SEQ ID No. 15, SEQ ID No. 16, SEQ ID No. 17, SEQ ID No. 18, SEQ ID No. 19, SEQ ID No. 20, SEQ ID No. 21, SEQ ID No. 22, SEQ ID No. 23, SEQ ID No. 24, SEQ ID No. 25, SEQ ID No. 26, SEQ ID No. 27, SEQ ID No. 28 and SEQ ID No. 29 and the peptide sequences which exhibit at least 70% identity, preferably at

least 80% identity and advantageously at least 98% identity with any one of the peptide sequences SEQ ID No. 1 to 29, the fragments complementary to said fragments and the fragments which encode the peptide sequences or the fragments of said sequences belonging to the same family of proteins chosen from Perlecan, the precursor of the retinol-binding plasma protein, precursor of the ganglioside GM2 activator, calgranulin B and saposin B.

51. The use, to test the efficacy of a therapeutic agent for a pathological condition associated with multiple sclerosis, of recombinant proteins and/or proteins encoded by all or part of the nucleotide fragments defined in claim 50.

52. The use of at least one nucleotide fragment for the preparation of a pharmaceutical composition for treating multiple sclerosis, according to which said nucleotide fragment is chosen from the fragments which encode at least one fragment of a protein, said protein being chosen from proteins whose peptide sequence in the native state corresponds to SEQ ID No. 1, SEQ ID No. 2, SEQ ID No. 3, SEQ ID No. 4, SEQ ID No. 5, SEQ ID No. 6, SEQ ID No. 7, SEQ ID No. 8, SEQ ID No. 9, SEQ ID No. 10, SEQ ID No. 11, SEQ ID No. 12, SEQ ID No. 13, SEQ ID No. 14, SEQ ID No. 15, SEQ ID No. 16, SEQ ID No. 17, SEQ ID No. 18, SEQ ID No. 19, SEQ ID No. 20, SEQ ID No. 21, SEQ ID No. 22, SEQ ID No. 23, SEQ ID No. 24, SEQ ID No. 25, SEQ ID No. 26, SEQ ID No. 27, SEQ ID No. 28 and SEQ ID No. 29 and the peptide sequences which exhibit at least 70% identity, preferably at least 80% identity and advantageously at least 98% identity with any one of the peptide sequences SEQ ID No. 1 to 29, the fragments complementary to said fragments and the fragments which encode the peptide sequences or

the fragments of said sequences belonging to the same family of proteins chosen from Perlecan, the precursor of the retinol-binding plasma protein, precursor of the ganglioside GM2 activator, calgranulin B and saposin B.

53. The use, for the preparation of a pharmaceutical composition for treating multiple sclerosis, of recombinant proteins and/or proteins encoded by all or part of the nucleotide fragments defined in claim 52.

54. The use as claimed in claim 50 or 52, characterized in that said nucleotide fragment encodes said protein.

55. The use as claimed in claim 54, characterized in that the polypeptides are chosen from SEQ ID No. 2, 4, 8, 9, 17, 24.

56. The use as claimed in claim 50, characterized in that said fragment is a fragment of a nucleic sequence chosen from any one of SEQ ID No. 30, SEQ ID No. 31, SEQ ID No. 32, SEQ ID No. 33, SEQ ID No. 34, SEQ ID No. 35, SEQ ID No. 36, SEQ ID No. 37, SEQ ID No. 38, SEQ ID No. 39, SEQ ID No. 40, SEQ ID No. 41, SEQ ID No. 42, SEQ ID No. 43, SEQ ID No. 44, SEQ ID No. 45, SEQ ID No. 46 and SEQ ID No. 47, SEQ ID No. 48, SEQ ID No. 49 and SEQ ID No. 50, SEQ ID No. 51, SEQ ID No. 52, SEQ ID No. 53, SEQ ID No. 54, SEQ ID No. 55, SEQ ID No. 56, SEQ ID No. 57, SEQ ID No. 66, SEQ ID No. 67, SEQ ID No. 69, SEQ ID No. 70 and SEQ ID No. 71, and their complementary sequences.

57. The use as claimed in claim 52, characterized in that said fragment is a fragment of a nucleic sequence chosen from any one of SEQ ID No. 30, SEQ ID No. 31, SEQ ID No. 32, SEQ ID No. 33, SEQ ID

No. 34, SEQ ID No. 35, SEQ ID No. 36, SEQ ID No. 37, SEQ ID No. 38, SEQ ID No. 39, SEQ ID No. 40, SEQ ID No. 41, SEQ ID No. 42, SEQ ID No. 43, SEQ ID No. 44, SEQ ID No. 45, SEQ ID No. 46 and SEQ ID No. 47, SEQ ID No. 48, SEQ ID No. 49 and SEQ ID No. 50, SEQ ID No. 51, SEQ ID No. 52, SEQ ID No. 53, SEQ ID No. 54, SEQ ID No. 55, SEQ ID No. 56, SEQ ID No. 57, SEQ ID No. 66, SEQ ID No. 67, SEQ ID No. 69, SEQ ID No. 70 and SEQ ID No. 71, and their complementary sequences.

58. The use as claimed in claim 56 or 57, characterized in that the nucleic sequence is chosen from SEQ ID No. 30, 31, 42, 53.

59. The use of lycorine for the preparation of a composition for preventing and/or treating multiple sclerosis.